

(5) and the extreme monthly mean for August, during the period of observation and the years of occurrence:

State and station.	County.	(1) Normal for the month of Aug.	(2) Length of record.	(5) Extreme monthly mean for August.				
				(3) Mean for Aug., 1891.	(4) Departure from normal.	Highest.	Year.	Lowest.
Arkansas.		°	Years	°	°	°		
Lead Hill.	Boone	77.9	9	77.7	- 0.2	81.0	1886	75.5
California.							1882	
Sacramento.	Sacramento	71.4	38	69.0	- 2.4	76.0	1866	66.2
Connecticut.							1887	
Middletown.	Middlesex	73.8	19	70.0	- 3.8	73.0	1870	65.9
Florida.							1861	
Merritts Island.	Brevard	81.2	9	83.4	+ 2.2	83.8	1883	78.8
Georgia.							1889	
Forsyth.	Monroe	78.8	17	78.7	- 0.1	82.4	1878	73.2
Illinois.							1885	
Peoria.	Peoria	75.4	35	72.2	- 3.2	80.5	1881	70.1
Riley.	McHenry	68.7	35	67.8	- 0.9	73.4	1867	64.1
Indiana.							1885	
Vevay.	Switzerland	74.9	25	72.2	- 2.7	80.7	1881	69.9
Iowa.							1875	
Cresco.	Howard	68.9	18	65.8	- 3.1	72.6	1881	63.1
Monticello.	Jones	70.0	37	68.1	- 1.9	77.1	1861	64.3
Logan.	Harrison	73.4	17	72.1	- 1.3	79.6	1881	68.2
Kansas.							1875	
Lawrence.	Douglas	75.3	23	72.5	- 2.8	83.4	1874	71.1
Wellington.	Sumner	76.7	12	.....	.....	82.6	1881	70.1
Louisiana.							1884	
Grand Coteau.	Saint Landry	81.3	8	.....	.....	83.6	1883	78.9
Maine.							1889	
Orono.	Penobscot	65.3	21	66.2	+ 0.9	67.5	1881	63.1
Maryland.							1874	
Cumberland.	Allegany	69.8	32	70.5	+ 0.7	75.7	1871, '72	63.6
Massachusetts.							1866	
Abercrombie.	Hampshire	67.3	55	68.5	+ 1.2	71.6	1872	63.5
Newburyport.	Essex	66.9	13	68.3	+ 1.4	69.5	1882	65.3
Somerset.	Bristol	71.6	19	74.7	+ 3.1	75.0	1877	68.6
Michigan.							1874	
Kalamazoo.	Kalamazoo	69.2	14	70.0	+ 0.8	73.0	1881	63.8
Thornville.	Lapeer	69.3	14	68.8	- 0.5	74.5	1881	64.7
Minnesota.							1885	
Minneapolis.	Hennepin	67.9	26	67.4	- 0.5	72.3	1881	63.8
Montana.							1885	
Fort Shaw.	Lewis & Clarke	64.8	21	.....	.....	69.8	1882	53.7
New Hampshire.	Grafton	65.8	45	64.6	- 1.2	70.4	1881	59.2
Hanover.							1885	
New Jersey.	Burlington	72.0	28	71.9	- 0.1	76.1	1864	68.1
Moorestown.	Essex	70.7	20	70.8	+ 0.1	74.5	1877	68.1
South Orange.							1883, '89	
New York.								
Cooperstown.	Otsego	65.5	37	66.0	+ 0.5	71.5	1877	61.0
Palermo.	Oswego	66.8	31	67.3	+ 0.5	71.6	1877	61.6
North Carolina.							1885	
Lenoir.	Caldwell	73.2	18	72.6	- 0.6	77.0	1877	70.0
Ohio.							1890	
N'th Lewisburgh.	Champaign	70.7	59	71.9	+ 1.2	75.0	1880	64.0
Wauseon.	Fulton	69.3	21	69.9	+ 0.6	72.8	1872	63.0
Oregon.							1870	
Albany.	Linn	65.7	13	67.2	+ 1.5	68.7	1888	62.5
Eola.	Polk	64.9	21	66.4	+ 1.5	68.6	1870	61.2
							1881	

Deviations from normal temperature—Continued.

State and station.	County.	(1) Normal for the month of Aug.	(2) Length of record.	(5) Extreme monthly mean for Aug.				
				(3) Mean for Aug., 1891.	(4) Departure from normal.	Highest.	Year.	Lowest.
Pennsylvania.	Dyberry	°	Years	°	°	°		°
Grampian Hills.	Wayne	64.3	23	65.0	+ 0.7	68.3	1872	58.4
Wellstorongh.	Clearfield	67.5	27	67.5	0.0	73.1	1881	62.1
South Carolina.	Tioga	65.7	12	62.0	- 3.7	71.3	1881	62.0
Statesburgh.	Sumter	76.7	10	75.3	- 1.4	79.7	1881	73.5
Tennessee.	Austin	78.6	20	76.4	- 2.2	84.6	1881	75.8
Texas.	Wilson	82.4	19	81.8	- 0.6	84.4	1873	79.4
Veruont.	Austin	67.5	18	67.0	- 0.5	72.6	1884	63.9
Strafford.	Orange	76.5	23	77.6	+ 1.1	80.1	1877, '78	65.3
Virginia.	Birdsneck	76.5	23	77.6	+ 1.1	80.1	1877, '78	65.3
Washington.	Northampton	61.4	18	61.2	- 0.2	64.3	1874	58.9
Fort Townsend.	Jefferson	68.9	19	68.4	- 0.5	72.2	1878	64.2
Wisconsin.	Dane	.....	.....	.....	.....	.....	.....	.....

FROST.

Attending a cool wave with unprecedented low temperature for the season in the Gulf States and from the Mississippi River to the Rocky Mountains, frost was reported from the Missouri and Arkansas valleys to the Lake Superior region from the 21st to 24th. In the states of the middle Missouri and extreme upper Mississippi valleys the frost of this period damaged crops and tender vegetation. During the 28th and 29th a cool wave extended over the Lake region and thence over the Ohio Valley and the middle Atlantic states, attended at stations in the Lake region, the Ohio Valley, and Virginia by the lowest temperature ever noted for August, and frost from Manitoba and the Dakotas over the Lake region to extreme western New York. On the 28th temperature below freezing was reported in north and west-central parts of Wisconsin, and on the 29th ice $\frac{1}{2}$ inch thick was reported at Crandon, Wis.

Records for the last 10 years show the occurrence in August of damaging frost in Michigan for 5 years, in the Dakotas for 4 years, in New York, Minnesota, and Pennsylvania for 3 years, in Wisconsin, Nebraska, and Iowa for 2 years, and in Montana, Illinois, Massachusetts, New Hampshire, and Vermont for one year.

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada, for August, 1891, as determined from the reports of nearly 2,000 stations, is exhibited on Chart III. In the table of miscellaneous meteorological data the total precipitation and the departure from the normal are given for regular stations of the Weather Bureau. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

The monthly precipitation was greatest in areas from the lower Missouri valley to the south Atlantic states and Florida. In southern Virginia and thence over the south Atlantic states, in west-central and extreme southern Florida, and from north-central Missouri over south-central Iowa it exceeded 10.00, and more than 8.00 was reported in areas in the middle Ohio valley, southeast Kentucky, and northern and eastern Tennessee. Over the greater part of California and at stations in the middle plateau region no precipitation was reported, and over the greater part of the middle and northern plateau regions, on the northeast slope of the Rocky Mountains, and in areas in south Texas, Indian Territory, Kansas, east Nebraska, the

lower Mississippi valley, and on the east Gulf coast less than 1.00 fell.

A notable feature of the month was the distribution of precipitation in Arizona and southern California. In Arizona the rainfall exceeded 5.00 in the mountains south of Prescott and in the southeastern part of the territory, while at points in the Gila Valley no rain fell. In southern California heavy rain storms, resulting in destructive floods, occurred in the mountains in the southwest part of San Bernardino county and in San Diego county, while on the neighboring coast no precipitation occurred. The irregular distribution of precipitation from the Missouri Valley to the Atlantic coast was also due to the heavy downpours of rain in limited areas which characterize summer storms.

DEPARTURES FROM NORMAL PRECIPITATION.

East of the Rocky Mountains the areas of excess and deficiency were irregularly distributed. The monthly precipitation was generally in excess of the normal along the Pacific coast, over the northern plateau region and the east part of middle plateau region, in the upper Mississippi and lower Ohio valleys, in adjoining parts of northeast Texas and northwest Louisiana, over the northern part of the Lake region, in

the upper and middle Saint Lawrence valleys, and in areas in the Atlantic coast states; elsewhere it was deficient. The greatest excess was noted at Key West, Fla., where it exceeded 5.00; it exceeded 4.00 at Savannah, Ga., and Wilmington, N. C., and was more than 2.00 at New Haven, Conn., Albany, N. Y., in southwest Ontario, and in an area extending from central Indiana to southeast Iowa and northeast Missouri. The most marked deficiency occurred from the Rio Grande River to eastern Kansas, along the middle and east Gulf coasts, at Jacksonville, Fla., and over Cape Breton Island, where it was more than 2.00.

Considered by districts the average percentage of the normal in districts where the precipitation was in excess was about as follows: Key West, Fla., 210; Spokane Falls, Wash., 180; upper lake region, 132; south Atlantic states, 126; upper Mississippi valley, 125; north Pacific coast, 113; northeast slope of the Rocky Mountains, 111. In districts where the precipitation was deficient the percentage of the normal was about as follows: southern plateau region, 23; Rio Grande Valley, 34; east Gulf states, 37; southeast slope of the Rocky Mountains, 38; middle-eastern slope of the Rocky Mountains, 55; Missouri Valley, 57; middle plateau region, 62; west Gulf states, 69; lower lake region, 80; New England, 90; Ohio Valley and Tennessee, 92. On the south Pacific coast no precipitation was reported, and an entire absence of rainfall in that region and in the central valleys of California is not unusual in August. On the middle Pacific coast, in the extreme northwest, and in the middle Atlantic states the monthly precipitation averaged about normal.

YEARS OF GREATEST AND LEAST PRECIPITATION FOR AUGUST.

The greatest precipitation ever reported for August occurred at Wilmington, N. C., Statesburgh, S. C., Forsyth, Ga., Key West, Fla., Keokuk, Iowa, Denver, Colo., and Fort Townsend, Wash., in 1891; on the north Pacific coast in 1889; in the lower Missouri, lower Ohio, and lower Mississippi valleys in 1888; over the northern plateau in 1887; in the upper Mississippi valley north of the 39th parallel in 1885; along the east Gulf coast in 1881; along the Pacific coast between the 38th and 45th parallels in 1879; and in Maine in 1877.

The least precipitation ever reported for August occurred at Pensacola, Fla., Lead Hill, Ark., and Concordia, Kans., in 1891; in Colorado, New Mexico, and western Texas in 1889; over the northern plateau region in 1888; on the north Pacific coast in 1885; in eastern New England in 1883; from southeastern Wyoming over the middle Missouri valley in 1882; from Lake Erie over Virginia and North Carolina in 1881; and over the greater part of New York in 1876.

In 1891, when the monthly precipitation was the greatest ever reported for August at stations in the south Atlantic states, over extreme southern Florida, in the upper Mississippi valley, over the east part of the middle plateau, and in west Washington, it was the least ever noted for that month at points on the east Gulf coast, in north Arkansas, and northeastern Kansas; in 1889 it was the greatest on record on the north Pacific coast and the least over the east part of the southern plateau region; in 1888 it was greatest in the south-central valleys and least over the northern plateau region; in 1885 it was greatest in the upper Mississippi valley and least on the north Pacific coast; and in 1881 it was greatest on the east Gulf coast and least from Lake Erie to the Virginia and North Carolina coasts.

PRECIPITATION, JANUARY TO AUGUST.

For the period January to August, 1891, inclusive, the precipitation averaged about normal in New England, the south Atlantic and west Gulf states, the Ohio Valley and Tennessee, the upper lake region, the upper Mississippi and Missouri valleys, on the southeast slope of the Rocky Mountains, over the middle and northern plateau regions, and along the Pacific coast. On the northeast slope of the Rocky Mountains the precipitation averaged about one-third greater, and in the

middle Atlantic states, the extreme northwest, and on the middle-easterly slope of the Rocky Mountains it was one-tenth to two-tenths greater than usual. At Key West, Fla., on the east Gulf coast, in the Rio Grande Valley, the lower lake region, and over the southern plateau region the precipitation was eight to nine-tenths of the usual amount for the period named.

O DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for August for a series of years; (2) the length of record during which the observations have been taken and from which the average has been computed; (3) the total precipitation for August, 1891; (4) the departure of the current month from the average; (5) and the extremes for August during the period of observation and the years of occurrence:

State and station.	County.	For the month of Aug.				(5) Extremes for Aug.			
		(1) Average for the month of Aug.	(2) Length of record.	(3) Total for Aug., 1891.	(4) Departure from average.	Greatest.		Least.	
		Inches.	Years.	Inches.	Inches.	Am't.	Year.	Am't.	Year.
Arkansas.									
Lead Hill	Boone	6.02	9	2.37	-3.65	11.53	1888	2.37	1891
California.									
Sacramento	Sacramento .	T.	41	0.00	-T.	0.08	1864	0.00	*
Connecticut.									
Middletown	Middlesex	5.40	29	3.52	-1.88	10.22	1867	1.16	1865
Florida.									
Merritts Island	Brevard	6.26	13	3.65	-2.61	15.77	1880	1.15	1883
Georgia.									
Forsyth	Monroe	4.79	17	8.05	+3.26	8.05	1891	2.50	1888
Illinois.									
Peoria	Peoria	3.04	35	5.71	+2.67	9.04	1862	0.57	1883
Riley	McHenry	4.02	40	1.95	-2.07	15.73	1850	0.77	1889
Indiana.									
Logansport	Cass	3.13	17	3.18	+0.05	6.30	1886	0.67	1881
Iowa.									
Vevay	Switzerland	3.26	26	6.52	+3.26	10.90	1879	0.02	1889
Kansas.									
Cresco	Howard	3.16	18	2.63	-0.53	8.34	1884	0.92	1889
Monticello	Jones	3.87	26	4.11	+0.24	8.54	1885	0.22	1889
Logan	Harrison	4.32	24	3.31	-1.01	5.15	1889	0.61	1885
Louisiana.									
Lawrence	Douglas	3.85	26	1.18	-2.67	9.07	1888	0.09	1882
Wellington	Sumner	3.00	12	.....	.....	5.15	1888	0.61	1885
Maine.									
Grand Coteau	St. Landry	3.96	8	.....	.....	8.07	1888	0.42	1883
Maine.									
Orono	Penobscot	3.64	21	4.67	+1.03	7.36	1885	0.53	1883
Maryland.									
Cumberland	Allegany	3.26	20	3.44	+0.18	8.09	1882	0.31	1881
Massachusetts.									
Amherst	Hampshire	4.43	55	4.70	+0.27	12.13	1856	0.25	1882
Newburyport	Essex	3.64	13	2.04	-1.60	7.57	1887	0.75	1883
Somerset	Bristol	4.24	19	2.12	-2.12	8.08	1880	0.53	1882
Michigan.									
Kalamazoo	Kalamazoo	2.69	15	3.24	+0.55	8.94	1885	0.31	1889
Thornville	Lapeer	3.12	14	3.07	-0.05	6.69	1877	0.35	1889
Minnesota.									
Minneapolis	Hennepin	3.74	25	3.78	+0.04	11.64	1869	0.47	1883
Montana.									
Fort Shaw	Lewis & Clarke	0.84	21	.....	.....	3.01	1876	0.00	71, '89
New Hampshire.									
Hanover	Grafton	3.76	46	3.21	-0.55	9.46	1849	0.12	1854
New Jersey.									
Moorestown	Burlington	4.65	28	4.52	-0.13	9.44	1882	0.81	1881
South Orange	Essex	5.29	20	5.51	+0.22	12.55	1875	1.10	1886
New York.									
Cooperstown	Otsego	3.88	37	4.26	+0.38	9.46	1856	0.63	1876
Palermo	Oswego	2.54	37	2.05	-0.49	6.40	1864	0.41	1866
North Carolina.									
Lenoir	Caldwell	5.90	19	5.90	0.00	10.20	1886	2.10	1877
Ohio.									
N. Lewishburg	Champaign	3.60	19	1.70	-1.90	7.55	1882, '85	0.80	1884
Wauseon	Fulton	2.85	19	3.43	+0.58	4.86	1886	1.12	1884
Oregon.									
Albany	Linn	0.49	12	1.15	+0.66	1.62	1881	0.00	85, '88
Eola	Polk	0.41	22	0.54	+0.13	1.81	1879	0.00	*
Pennsylvania.									
Duberry	Wayne	3.85	19	4.75	+0.90	8.77	1885	0.95	1883
Grampian Hills	Clearfield	4.34	21	4.08	-0.26	8.19	1888	1.66	1883
Wellisborough	Tioga	5.27	12	3.57	-1.70	15.25	1885	0.83	1889
South Carolina.									
Statesburgh	Sumter	4.33	10	8.78	+4.45	8.78	1891	2.12	1886
Tennessee.									
Austin	Wilson	3.72	22	4.05	+0.33	7.80	1871	0.50	1881
Texas.									
New Ulm	Austin	3.17	19	2.43	-0.74	8.38	1878	0.09	1885
Vermont.									
Stratford	Orange	3.73	18	3.50	-0.23	8.85	1890	1.40	1882
Virginia.									
Birdsneck	Northampton	4.55	22	7.15	+2.60	11.25	1875	0.20	1869
Washington.									
Fort Townsend	Jefferson	0.80	17	2.52	+1.72	2.52	1891	0.00	1885
Wisconsin.									
Madison	Dane	3.28	20	1.41	-1.87	6.83	1882	0.56	1881

*Generally.

EXCESSIVE PRECIPITATION.

The following tables show the number of years for which monthly precipitation to equal or exceed 10.00 inches, daily precipitation to equal or exceed 2.50 inches, and hourly precipitation to equal or exceed 1.00 inch has been reported in the several states and territories for August during the last 22 years:

Excessive monthly precipitation.

State.	No. years noted.	State.	No. years noted.
Florida	18	Wisconsin	
North Carolina	16	Kentucky	
Georgia	15	Arkansas	
South Carolina	10	Delaware	
Alabama	9	Maine	
Virginia	9	Mississippi	
Texas	8	West Virginia	
New York	8	Arizona	
Kansas	7	Colorado	
Louisiana	7	The Dakotas	
Illinois	6	District of Columbia	
New Hampshire	6	Minnesota	
New Jersey	6	New Mexico	
Indiana	6	Vermont	
Iowa	6	California	
Connecticut	5	Idaho	
Ohio	5	Indian Territory	
Massachusetts	5	Montana	
Pennsylvania	5	Nevada	
Missouri	5	Oregon	
Maryland	4	Utah	
Tennessee	4	Washington	
Michigan	3	Wyoming	
Nebraska	3		

Excessive daily precipitation.

State.	No. years noted.	State.	No. years noted.
Georgia	20	Wisconsin	11
Texas	19	Nebraska	9
Florida	18	Indiana	9
North Carolina	18	Maryland	8
South Carolina	17	New Hampshire	7
Pennsylvania	15	West Virginia	6
Iowa	15	Indian Territory	6
Missouri	14	Delaware	5
New York	14	Arizona	5
Tennessee	14	Kentucky	4
Massachusetts	13	Rhode Island	3
Illinois	13	Montana	2
Mississippi	13	Vermont	2
Alabama	12	Colorado	1
Ohio	12	Maine	1
Kansas	12	California	1
Michigan	12	District of Columbia	0
Connecticut	11	Idaho	0
The Dakotas	11	Nevada	0
Arkansas	11	New Mexico	0
Louisiana	11	Oregon	0
Minnesota	11	Utah	0
New Jersey	11	Washington	0
Virginia	11	Wyoming	0

Excessive hourly precipitation.

State.	No. years noted.	State.	No. years noted.
Texas	16	Alabama	
Florida	14	Connecticut	
Georgia	14	Kentucky	
Tennessee	14	New Jersey	
Pennsylvania	13	Massachusetts	
Kansas	12	New Hampshire	
Ohio	12	New Mexico	
Iowa	11	Wisconsin	
North Carolina	11	Maine	
Michigan	10	Montana	
South Carolina	10	Rhode Island	
Virginia	10	Minnesota	
The Dakotas	9	District of Columbia	
Nebraska	9	Indian Territory	
Illinois	8	Vermont	
Indiana	8	West Virginia	
New York	8	California	
Maryland	7	Washington	
Mississippi	7	Idaho	
Louisiana	6	Nevada	
Arizona	5	Oregon	
Arkansas	5	Utah	
Missouri	5	Wyoming	
Colorado	4		

The following tables show, by states, the number of stations reporting monthly precipitation to equal or exceed 10.00; precipitation to equal or exceed 2.50 in 24 hours; and precipitation to equal or exceed 1.00 in 1 hour in August, 1891:

Monthly precipitation to equal or exceed 10.00.

State.	Number of stations.	State.	Number of stations.
South Carolina	13	Virginia	2
North Carolina	9	California	1
Georgia	5	Indiana	1
Missouri	4	Iowa	1
Tennessee	3	Kentucky	1
Florida	2	New York	2

Precipitation to equal or exceed 2.50 in 24 hours.

State.	Number of stations.	Dates.	State.	Number of stations.	Dates.
Missouri	13	13-14, 14-15, 15, 18-19, 18-20, 19-	New York	6	20, 21, 23-24, 24-25, 27,
Georgia	10	23, 24, 25, 26, 26-27, 27, 27-28,	Florida	4	1-2, 3, 17, 20, 20, 29-30,
North Carolina	10	1, 2-3, 12, 22-23, 23, 23-24, 25-26, 26-	Indiana	4	4-5, 17, 20, 20, 27,
		2-3, 10, 16, 16-17, 20, 20-21, 26-27,	Michigan	4	8, 20, 27,
		27,	Texas	4	2-3, 22-23,
		27,	Pennsylvania	3	23, 24,
		27,	Tennessee	3	20, 20-21, 21-22,
		27,	Kansas	2	11, 15,
		27,	Louisiana	2	4, 8-9,
		27,	Virginia	2	3, 25,
		27,	Wisconsin	2	11, 20,
		27,	Arizona	1	27-28,
		27,	Arkansas	1	21-22,
		27,	California	1	12,
		27,	Minnesota	1	6,
		27,	Mississippi	1	3,

Precipitation to equal or exceed 1.00 in 1 hour.

State.	Number of stations.	Dates.	State.	Number of stations.	Dates.
Iowa	10	1, 9, 10, 11, 17, 18, 20,	North Carolina	3	1, 2, 4, 25,
		27,	South Dakota	2	10, 14, 19,
Missouri	9	1, 11, 14, 15,	Arkansas	2	2, 11,
		19,	Kentucky	2	2, 17,
Georgia	8	4, 13, 22, 23, 25, 26, 27,	Minnesota	2	13, 20,
		28,	Mississippi	2	5-7,
		28,	New York	2	15, 23,
		28,	North Dakota	2	7, 19,
		28,	South Carolina	2	13, 21,
		28,	Tennessee	2	17, 20,
		28,	California	1	12,
		28,	Connecticut	1	28,
		28,	Louisiana	1	13,
		28,	Nebraska	1	18,
		28,	New Jersey	1	23,
		28,	Virginia	1	26,
		28,	Washington	1	6,
		28,	Wisconsin	1	11,

The following tables give exceptionally heavy daily, monthly, and hourly rainfalls reported for August during the last 22 years:

Daily (24 hours).

Station and state.	Amount.	Date.	Station and state.	Amount.	Date.
Campo, Cal *	11.50*	12, 1891	Johnstown, Va.	7.70	18, 1891
Griffin, Ga.	10.38	8, 1883	Marshall, Mo.	7.48	18-19, 1891
Granbury, Ga.	10.15	26, 1888	Central City, Ky.	7.02	22, 1891
Fort Barrancas, Fla.	9.75	29, 1878	Union Point, Ga.	6.60	26-27, 1891
Hatteras, N. C.	9.14	23, 1880	Carson, Iowa.	6.50	9, 1889
Tecumseh, Nebr.	9.00	12, 1889	Hazlehurst, Miss.	6.00	27, 1890
Elsworth, N. C.	9.00	4, 1880	Phillips, Wis.	6.00	8, 1890
New Orleans, La.	8.90	20, 1888	Clarksville, Tenn.	5.90	20, 1891
Mandeville, La.	8.54	8, 1888	Camp Eagle Pass, Tex.	5.50	2, 1891
Cape May, N. J.	8.46	18, 1879	Washington, Ga.	5.40	26, 1891
Kitty Hawk, N. C.	8.14	15, 1883	Fort Smith, Ark.	5.10	19-20, 1890
Vesper, Kans.	8.10	19, 1890	Lillington, N. C.	5.02	22-23, 1891
Grantsburgh, Wis.	7.75	19-20, 1889			

*Cloudburst; rainfall not all measured.

Monthly.

Station and state.	Am't.	Year.	Station and state.	Am't.	Year.
Inches.	Year.	Inches.	Year.	Inches.	Year.
Fort Barrancas, Fla.	30.73	1878	Charleston, Ill.	23.04	1882
Asheville, N. C.	28.65	1887	New Smyrna, Fla.	23.09	1871
Elsworth, N. C.	28.33	1880	New Orleans, La.	22.74	1888
Fort Barrancas, Fla.	25.07	1879	Tarborough, N. C.	22.73	1887
Maurepas, La.	23.44	1888	Saint Augustine, Fla.	21.50	1871
Newport, Fla.	23.25	1872	Fairview, Fla.	21.35	1871

One hour and less.

Station and state.	Amount.	Time.	Date.
Inches.	h. m.		
Savannah, Ga.	0.50	0 05	28, 1891
Indianapolis, Ind.	0.45	0 05	19, 1891
New York, N. Y.	0.43	0 05	18, 1887
Wilmington, N.C.	0.43	0 05	4, 1891
Galveston, Tex.	0.40	0 05	4, 1890
Kansas City, Mo.	0.40	0 05	15, 1891
Eastport, Me.	0.40	0 05	12, 1891
Galveston, Tex.	0.39	0 05	22, 1891
Jupiter, Fla.	0.35	0 05	2, 1890
Philadelphia, Pa.	0.30	0 05	28, 1891
Saint Louis, Mo.	0.35	0 05	11, 1891
Saint Paul, Minn.	0.35	0 05	20, 1891
Atlanta, Ga.	0.35	0 05	18, 1891
Dodge City, Kans.	0.34	0 05	12, 1891
Memphis, Tenn.	0.32	0 05	26, 1890
New York, N. Y.	0.30	0 05	23, 1891
Washington, D. C.	0.30	0 05	1, 1890
Norfolk, Va.	2.48	0 10	20, 1888
Do.	0.75	0 10	4, 1890
Galveston, Tex.	0.60	0 10	30, 1891
Key West, Fla.	0.59	0 10	4, 1888
New York, N. Y.	0.50	0 10	13, 1888
Charleston, S.C.	0.40	0 10	26, 1890
Lead Hill, Ark.	0.40	0 10	4, 1890
Escanaba, Mich.	0.40	0 10	21, 1888
Albany, N. Y.	1.41	0 15	9, 1890
Nashville, Tenn.	1.00	0 15	2, 1888
Emporia, Pa.	1.27	0 20	11, 1877
Parkersburgh, W. Va.	1.25	0 20	2, 1878
Mossing Ford, Va.	1.10	0 20	17, 1891
Louisville, Ky.	1.05	0 20	5, 1890
Hardin, Colo.	1.01	0 20	1, 1890
Galveston, Tex.	1.00	0 20	2, 1890
Fort Smith, Ark.	1.26	0 23	20, 1878
Colorado Springs, Colo.	1.52	0 24	13, 1860
Mesquite, Tex.	1.55	0 25	17, 1871
Wellsville, Pa.	1.00	0 25	11, 1891
Vevay, Ind.	2.75	0 30	14, 1890
Grantsburgh, Wis.	2.50	0 30	10, 1875
Queensbury, N. Y.	1.95	0 30	21, 1885
Mount Auburn, Ohio.	1.90	0 30	13, 1879
Providence, R. I.	1.88	0 30	7, 1889
Auburn, N. H.	1.56	0 30	14, 1860
Hulmeville, Pa.	1.52	0 30	20, 1880
Pittsburg, Pa.	3.04	0 35	6, 1878
Cincinnati, Ohio.	2.20	0 35	25, 1888
Jacksonville, Fla.	1.85	0 35	16, 1884
Hudson, Wis.	1.85	0 35	27, 1882
Detroit, Mich.	3.72	0 41	20, 1873
Charlotte, N. C.	2.50	0 45	11, 1891
Fort Union, N. Mex.	2.48	0 45	31, 1875
Princeton, Mo.	2.01	0 45	3, 1890
Campo, Cal.	2.34	0 50	12, 1883
Plover, Wis.	4.00	1 05	15, 1891
Carson, Iowa.	11.50	1 20	12, 1891
	4.50	1 30	3, 1890
	6.50	4 00	9, 1889

Table of excessive precipitation, August, 1891.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.	Rainfall of 1 inch, or more, in one hour.	C		
				Am't.	Day.	Pay.
Alabama.	Inches.	Inches.	Inches.	h. m.		
Auburn			1.28	1 15	13	
Marion			1.10	0 30	13	
Mobile			1.25	0 53	13	
Tuscaloosa			1.45	1 00	1	
Arizona.						
Bisbee			2.00	2 00	6	
Do.			2.05	2 00	17	
Farleys Camp			1.30	1 00	15	
Do.			3.25	27-28	3-10	
Oro.			3.10	1 30	28	
Red Rock			1.50	1 00	5	
Do.			1.00	1 00	14	
Arkansas.						
Dallas			2.75	21-22	1.00	0 25
Fort Smith						

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.	Rainfall of 1 inch, or more, in one hour.	C		
				Am't.	Day.	Am't.
Arkansas—Continued.	Inches.	Inches.	Inches.	h. m.		
Helena (1)				1.15	1 00	2
California.						
Campo	16.10	11.50	12	II-50*	1 20	12
Connecticut.						
New London						
Florida.						
Alva				2.63	12-13	1.84 0 35
Gainesville				4.04	29-30	3.41 3 18
Key West	10.13	3.20	1-2			30
Miami						
Saint Petersburg	13.32	2.96	20			22
Tampa						
Tarpon Springs						6
Georgia.						
Augusta						1.23 0 55
Do.				3.12	26-27	1.73 0 38
Camak						2.83 2 50
Cordele						2.72 27
Porsyth						
Fort Gaines				4.40	27	4.40 4 30
Gainesville				2.90	23	2.90 2 20
Macon	10.10					
Monticello				2.85	23	
Milledgeville				2.83	25	
Do.				2.82	24	
Poulan						1.15 0 30
Quitman (2)				3.70	25	
Savannah	11.54					1.30 1 00
Do.				3.30	27-28	2.75 2 00
Union Point	11.81	6.60	26			
Washington	12.64	5.40	26			
Waynesborough	11.35	3.82	24			
Illinois.						
Aurora (1)						2.39 2 35
Centralia				4.41	16-17	1.20 1 00
Cockrell						1.00
East Peoria				3.12	26-27	
Louisville				3.30	2-3	
New Haven				3.22	16-17	
Olney (1)				3.10	20	
Olney (2)				2.51	20-21	
Oswego						1.00 1 00
Palestine						2.00 1 15
Pana						1.00 1 00
Peoria (2)						2.56 2 05
Rushville						
Indiana.						
Columbus				3.02	3	
De Gonia Springs				3.00	17	
Evansville						1.00 1 00
Indianapolis						1.60 0 58
Marengo				4.00	1-2	
Seymour						1.48 0 40
Worthington	11.45	3.96	20			
Iowa.						
Amana				3.47	10-11	
Ames (1)						1.90 1 45
Do.						1.25 0 30
Ames (2)						2.01 2 00
Blakeville				3.00	10	
Carroll						1.22 0 25
Do.						1.61 0 50
Charles City				3.10	10	1.67 1 00
College Springs				3.06	18	
Cordova						1.01 1 00
Corning (1)				2.94	6	
Do.				2.88	18-19	
Corning (2)				3.16	18-19	1.61 0 45
Des Moines						1.19 0 55
Independence						2.15 1 30
Maxon.	13.02	3.60	10-11	1.81	1 05	1
Do.		3.23	16			
Tipton		3.05	10-11			
Vinton				1.29	1 00	10
Kansas.						
Dodge City						1.06 1 00
Emporia				3.30	11	
Fort Leavenworth (2)				2.60	15	1.10 1 00
Kansas City						2.34 1 00
Kentucky.						15
Central City	19.76	5.02		17		
Do.		6.01		19		
Earlington		7.02		22		
Frankfort (2)		2.93		22	1.28	0 40
Louisville		2.52		17		
Paducah		2.81	2	2-50	2 00	2
Princeton		2.60	17-18			
Louisiana.		2.70	18			
Amite City		3.10	4			
Lake Charles		2.90	8-9			
Monroe				1.88	1 10	13
Michigan.						
Alpena						1.54 1 00
Do.						1.05 1 00
Fort Mackinac				2.81	8	
Harrisville				3.06	8	
Hudson						1.52 1 20
Marquette						1.28 1 00
Marshall		2.75	20			
Do.		2.60	27			
May						

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall in inches, or more	Rainfall 2.50 inches, or more, in 24 hours.			Rainfall of 1 inch, or more, in one hour.		
		Amt.	Dey.	Amt.	Time.	Dey.	
Minnesota.	Inches.	Inches.					
Crookston.	3.22	6					
Saint Paul.			1.95	0 55		13	
Do.			1.16	1 00		20	
Mississippi.							
Logtown.	2.70	3					
Mayersville.			1.85	1 00		7	
Waynesborough (2).			1.79	1 15		5	
Missouri.							
Boonville.	5.37	18-20					
Bruswick.	4.00	13-14					
Carrolton.	11.47	3-39	14-15	1.48	0 30	11	
Do.	4.23	18-19					
Centreville.			1.20	1 00		11	
Chillicothe (1).	3.70	14-15					
Chillicothe (2).	10.50						
Conception.		3.86	13-14				
Fayette.			1.09	0 45		14	
Glasgow.	3.08	19	1.70	1 00		14	
Hermann.			2.20	1 30		19	
Kansas City.			1.30	0 58		1	
Do.			1.55	0 48		15	
Kidder.	2.70	14-15					
Lamonte (2).	2.92	19					
Langdon.	2.88	14					
Liberty.	4.55	18-19					
Marshall (2).	13.10	3-37	14-15				
Do.			7.48	18-19			
Oregon (1).		2.71	14-15				
Princeton.	4.80	14-15	4.00	1 05		15	
Saint Joseph.			1.27	0 36		11	
Springfield.			1.04	0 55		19	
Steelville.	13.10						
Nebraska.			1.89	1 00		18	
Norfolk.	New Jersey.						
Dover.	3.23	23-24					
Hanover.	2.50	23-24					
Highland Park.	3.60	23-24					
Junction.	2.52	21					
Locktown.	3.25	23-24					
New Brunswick.	3.84	23-24	2.55	1 50		23	
New York.							
Albany.			1.05	0 30		15	
Canton.	3.21	21					
Davids Island.	2.80	24-25					
Fort Columbus.	3.22	23-24					
New York, N. Y.	3.20	23-24	1.75	1 00		23	
Potsdam.	2.57	20					
Schodack Depot.	10.52	4-50	27				
North Carolina.							
Chapel Hill.	II.71						
Charlotte.	3.36	25-26					
Douglas.	2.50	12					
Goldsbrough.	10.78						
Lillington.	5.02	22-23					
Littleton.	10.29						
Lumberton.	10.64	3-27	2-3				
New Berne.	II.57						
Pittsburgh.	2.50	1					
Raleigh.	10.42	3-30	1	1.10	1 00	1	
Smithfield.	16.30	2.90	1	2.00	1 00	25	
Do.			2.50	26			
Southern Pines.	10.58	3.95	26				
Wadesborough.		2.55	23-24				
Wadeville.		2.56	1				
Wilmington.	II.96						
Do.		1.02	1 00	1			
Do.		1.60	1 00	2			
North Dakota.		1.06	1 00	4			
Fargo.			1.07	0 53		19	
Fort Pembina.			1.30	0 45		7	
Ashland.							
Gratiot.			1.49	0 25		19	
Kenton.			1.45	0 35		11	
Montpelier.			1.45	0 35		11	
Pennsylvania.			1.31	0 49		18	
Blooming Grove.	3.10	23					
Phoenixville.	3.61	24					
West Chester.	2.69	24					
South Carolina.							
Aiken.	14.89	2.80	27				
Allendale.	10.11						
Batesburgh.	11.05						
Branchville.	10.99	3.00	20				
Brewer Mine.	10.19						
Columbia.	2.65	26					
Cheraw (2).	10.55						
Evergreen.		2.60	27				
Greenwood.			1.20	0 30		21	
Hardeeville.	14.79	3.00	26				
Jacksonborough.	14.59	3.47	24				
Kingtree.	13.96	2.70	1				
Do.		4.55	24				
Port Royal.	14.00	3.55	13				
Do.		3.05	24				
Saint Georges.	10.61	3.00	26				
Saint Matthews.			2.22	1 30		13	
Trial.	10.83						
Wateree.	II.89						

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall in inches, or more	Rainfall 2.50 inches, or more, in 24 hours.			Rainfall of 1 inch, or more, in one hour.		
		Amt.	Dey.	Amt.	Time.	Dey.	
South Dakota.	Inches.	Inches.					
Fort Bennett.							
Sioux Falls.							
Tyndall.							
Tennessee.							
Clarksville.	10.38						
Grand Junction.							
Greeneville.	10.04						
Nashville.							
Riddleton.	10.03						
Texas.							
Brazoria.	2.79	22-23					
Camp Eagle Pass.	5.50	2	5-50			6 00	2
Corpus Christi.	4.80	2-3	1.10			0 55	
Do.						2.40	
Galveston.	3.44	22-23					
Hansford.						2.00	0 45
New Ulm.						1.42	1 15
Virginia.							
Birdsnest.	3.15	25					
Christiansburg.	11.86						
Clarksville.	12.41	3-95	3				
Norfolk.						1.62	1 00
Washington.							
East Sound.						1.44	1 00
Wisconsin.							6
Ellsworth.	3.00	20					
Hudson.	2.50	II	2.50			0 45	II
Received too late to be used in general discussion for August, 1891.							
Nebraska.							
Alliance.						1.28	0 30
New York.							
Factoryville.						1.45	1 00
Pennsylvania.							
Emporium.						1.64	1 00
Girardville.							4
Hamburg.						3.90	23
Kennett Square.							
Lewisburg.						2.61	24
Pottstown.							
Quakertown.						2.87	24
State College.							
Reading.						2.61	24
Smiths Corners.							
Received too late for publication in July, 1891.							
Louisiana.							
Coushatta (2).						2.87	6
Palo Alto.						15.58	
Mississippi.							
North Dakota.						2.06	2 00
Jamestown.						3.57	12
South Carolina.							
Kingtree.						3.05	28
West Virginia.							
Wheeling (1).						3.21	18
* Incomplete; cloud-burst carried away rain-gauge.							
MAXIMUM RAINFALL IN ONE HOUR OR LESS.							
The following table is a record of the heaviest rainfall during August, 1891, for periods of five and ten minutes and one hour, as reported by regular stations of the Weather Bureau furnished with self-registering gauges:							
Maximum fall in—							
Station.		5 min.	Date.	10 min.	Date.	1 hour.	Date.
		Inch.		Inch.		Inch.	
Atlanta, Ga.		0.35	18	0.55	18	0.55	18
Bismarck, N. Dak.		0.20	5	0.35	5	0.58	5
Boston, Mass.		0.15	28	0.21	28	0.34	28
Buffalo, N. Y.		0.20	9	0.30	9	0.30	9
Cincinnati, Ohio.		0.15	17	0.25	17	0.50	17
Chicago, Ill.		0.25	20	0.30	20	0.50	23
Cleveland, Ohio.		0.12	14	0.19	14	0.46	14
Denver, Colo.		0.20	17	0.37	17	0.80	17
Detroit, Mich.		0.09	30	0.13	30	0.38	30
Dodge City, Kans.		0.34	12	0.50	12	1.06	12
Duluth, Minn.		0.15	20	0.20	20	0.55	20
Eastport, Me.		0.40	12	0.50	12	0.75	22
Galveston, Tex.		0.39	22	0.60	22	0.91	22-23
Indianapolis, Ind.		0.45	19	0.65	19	1.60	19
Jacksonville, Fla.		0.25	26	0.38	27	0.90	14
Jupiter, Fla.		0.35	13	0.45	13	0.55	30
Kansas City, Mo.		0.40	15	0.80	15	1.55	15
Key West, Fla.		0.30	30	0.60	30	1.70	30
Marquette, Mich.		0.23	20	0.36	20	1.28	20

Maximum rainfall in one hour or less—Continued.

Station.	Maximum fall in—					
	5 min.	Date.	10 min.	Date.	1 hour.	Date.
	Inch.		Inch.		Inch.	
Memphis, Tenn.	0.15	30	0.20	22, 30	0.70	30
New York, N. Y.	0.30	23	0.40	23	1.15	23
New Orleans, La.	0.22	7	0.24	7	0.38	7
Norfolk, Va.	0.30	26	0.46	26	1.62	26
Philadelphia, Pa.	0.36	28	0.50	28	0.60	1
Philadelphia Water Works	0.12	23	0.23	23	0.75	23
Pittsburg, Pa.	0.10	11	0.15	11	0.27	11
Portland, Oregon	0.03	4	0.05	4	0.20	4
Saint Louis, Mo.	0.35	11	0.60	11	0.80	11
Saint Paul, Minn.	0.35	20	0.62	20	1.16	20
San Diego, Cal.						
San Francisco, Cal.						
Savannah, Ga.	0.50	28	0.75	28	1.70	28
Washington, D. C.	0.22	24	0.32	24	0.70	24
Wilmington, N. C.	0.43	4	0.64	2	1.60	2

* Less than 0.05 in 1 hour.

HAIL.

Description of the more severe hail storms of the month is given under "Local storms." Hail was reported as follows: 1st, Colorado, New Mexico. 2d, Colorado, Indiana, New Mexico, North Dakota. 3d, Colorado, Nebraska, Wyoming. 4th, Colorado, Oregon, South Dakota, Wyoming. 5th, Colorado, Montana, North Dakota, Wisconsin, Wyoming. 6th, Minnesota, North Dakota, Washington. 7th, Colorado, Minnesota, New Hampshire, New York, North Dakota, Wisconsin, Wyoming. 8th, Kansas. 9th, Colorado, Illinois, Michigan.

WINDS.

The prevailing winds in August, 1891, are shown on Chart II by arrows flying with the wind. Over the Atlantic coast states, the Florida Peninsula, the Gulf States, the Mississippi and middle and lower Missouri valleys, the south part of the Lake region, and the southern plateau southeast to southwest winds were most frequently noted; over the north part of the Lake region and thence westward over Montana they were generally from northwest to northeast; along the middle and south Pacific coasts from southwest to northwest; and on the north Pacific coast, and over the middle and northeast slopes of the Rocky Mountains, variable.

HIGH WINDS.

[In miles per hour.]

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Weather Bureau as follows: 21st, 82, sw., at Green Mountain, Me.; 80, w., at Mount Washington, N. H. 28th, 52, w., at Mount Killington, Vt.

LOCAL STORMS.

1st.—Heavy rain flooded farm lands near Baltimore, Md. In Franklin county, Pa., lightning struck a barn, killing 2 children. A severe storm was reported at Checotah, Ind. T., about 11 p. m.; several buildings were destroyed, stock killed, and damage caused to growing crops.

2d.—A thunderstorm, with exceptionally heavy rainfall, passed northeast over Louisville, Ky., in the evening. A severe windstorm was reported in Anne Arundel county, Md., in the afternoon.

3d.—During a heavy thunderstorm at Lexington, N. C., 2 persons were stunned, and a tree was struck by lightning. Heavy rain flooded lowlands west of Custer Station, Mont.

4th.—At Portland, Oregon, a thunderstorm, with hail, occurred in the evening. Heavy thunder, rain, and hail storms caused destruction to live stock and crops in Miner and McCook counties, S. Dak.

5th.—Heavy rain flooded small streams and lowlands in Dauphin and Chester counties, Pa., and Carroll county, Md. During a heavy thunderstorm in the evening at Churchs Ferry, N. Dak., 2 buildings were struck by lightning. An

10th, Iowa, New York, South Dakota. 11th, Colorado, Iowa, Maryland, Minnesota, Nebraska, New Jersey, New York, Oregon. 12th, Connecticut, Maryland, Texas. 13th, Georgia, Illinois, Iowa, Minnesota, Missouri, Nebraska, North Dakota, Wisconsin. 14th, Colorado, Illinois, Indiana, Missouri, Nebraska, Ohio, South Dakota, West Virginia. 15th, Colorado, Connecticut, Illinois, Indiana, Minnesota, Montana, Virginia. 16th, Indiana, Ohio, Wisconsin. 17th, Colorado, Wyoming. 18th, Colorado, Iowa, Nebraska. 19th, Nebraska, New York, North Dakota. 20th, Illinois, Kentucky, Nebraska. 21st, Colorado, Kansas, Missouri, New Jersey, Texas, Wyoming. 23d, Virginia. 24th, Nebraska. 25th, California, Colorado, Minnesota, Montana, South Dakota. 26th, Texas. 27th, Colorado. 28th, Arizona, Colorado, North Carolina, South Dakota. 29th, Colorado, Iowa, North Dakota, Wisconsin. 30th, Michigan. 31st, New York. Sleet fell in Colorado on the 17th, 29th, and 30th.

SNOW.

Snow was reported in the Paradise Mountains, 40 miles north of Winnemucca, Nev., on the 6th; in the mountain ranges of Colorado on the 22d and 23d; at Cumberland, Barron Co., Wis., the evening of the 22d and the morning of the 23d; and at Buffalo, N. Y., on the 28th.

Records for August of the last 10 years show that snow fell at Harrisburg, Pa., and along the upper Sault de Ste. Marie river, Mich., in 1890; at Mammoth, Pa.; in 1889; at Hartford, Conn., and Wilkes Barre, Pa., in 1885; and at Sandusky, Ohio, and Grand Haven, Mich., in 1882.

unusually heavy rainstorm was reported in Stark county, N. Dak. A heavy hailstorm occurred at night at Boulder, Jefferson county, Mont. At Fort Assiniboine, Mont., a heavy thunderstorm begun about 11 p. m. and continued about 3 hours; the storm was reported the most severe ever experienced in that section. A heavy rain and hail storm in the afternoon damaged standing grain at Lander, Wyo.

6th.—Several buildings were struck by lightning in Oxford and Androscoggin counties, Me. Near Crookston, Minn., a heavy rain and hail storm moved southeast in a path about 1½ mile in width and 8 miles in length, causing injury to grain. Heavy thunderstorms occurred in Manitoba; several fatalities were reported. At Dickinson, N. Dak., a wind, rain, and hail storm at night injured grain.

7th.—A heavy thunder rain, and hail storm moved southeast over Manchester, N. H., in the afternoon; hail fell in a path about 2 miles in width and 3 to 4 miles in length; the hailstones ranged to ¼ inch in diameter, were spherical in form, and generally of clear, solid ice; 0.50 inch of rain and melted hail fell in ten minutes, and the temperature fell 20° in 35 minutes. Severe thunderstorms occurred in Connecticut. An unusually severe thunderstorm moved north over Augusta, Ga., in the evening; the wind reached a velocity of 40 miles per hour from the southeast, large trees were prostrated, and the temperature fell 26° in 4 hours. Heavy rain and hail storms were reported in northwest Minnesota in the evening. Thunderstorms, with heavy rain and high wind, were reported in North and South Dakota. A severe storm was reported in the Gulf of California and in Lower California; this storm lasted several days and was very destructive.

8th.—A heavy storm prevailed over upper Michigan and the north part of lower Michigan. At Marquette, Mich., a violent thunderstorm occurred in the evening; the wind reached a velocity of 46 miles per hour, causing damage to trees, etc. At Sault de Ste. Marie, Mich., thunderstorms, with heavy rain, occurred at intervals; streets were flooded, trees blown down, and telegraphic communication was interrupted. During a thunderstorm in the early morning at Alpena, Mich., a barn was struck by lightning and burned. In the afternoon a thun-